

Claims as amended during International preliminary examination proceedings

Patent Claims

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1. UV-protection composition which comprises solid, polymorphic crystalline or partially crystalline lipid particles with a size below 5  $\mu\text{m}$  (average value of the main population), optionally as a solid inner phase (lipid phase) dispersed in an outer liquid phase, characterized in that the solid polymorphous particles showing an endothermic peak above 20°C during the heating-up phase in heat calorimetry (DSC - differential scanning calorimetry).
  2. Composition according to claim 1, characterized in that the lipid and/or polymer particles show a size (average of the main population) in the range of 10 nm to 1000 nm.
  3. Composition according to claim 1 or 2, characterized in that it contains one or more molecular and/or particulate UV blockers which are dissolved and/or dispersed in lipid the matrix material and/or adsorbed at the surface of the lipid particles, and it contains as molecular UV blockers one or more substances selected from benzophenone and its derivatives, in particular 4-phenylbenzophenone, 2-hydroxy-4-n-octyloxy-benzophenone, 2-hydroxy-4-methoxy-benzophe-none, 2,2'-dihydroxy-4,4'-dimethoxybenzophenone, suliso-benzene, benzimidazole derivatives, in particular phenyl-benzimidazo-le sulfonic acid, camphor derivatives, in particular 3-benzylidenecamphor, 3-(4-methylbenzylidene)-camphor, terephthalylidenedicamphor sulfonic acid, dibenzoylmethanes, in particular 4-isopropyl-dibenzoyl-methane, 4-tert.-butyl-4'-methoxy-dibenzoylmethane, cinnamic acid esters, in particular p-methoxycinnamic acid-2-ethylhexyl ester, p-methoxy-cinnamic acid isoamyl ester, p-methoxycinnamic acid octyl ester, p-methoxycinnamic acid propyl ester, p-amino-benzoic acid (PABA) and its derivatives, in particular p-aminobenzoic acid glycerol ester, butyl-PABA, octyl-di-

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methyl-PABA, 2-ethylhexyl salicylate, homosalate, Mexoryl® SX, Mexoryl® XL, octylsalicylate, octyltriazone, and oxybenzone.

4. Composition according to one of claims 1 to 3, characterized in that it contains as particulate UV blocker one or more inorganic pigments or organic pigments which is/are dispersed in the lipid matrix and/or is/are added to the surface of the lipid particles.
5. Composition according to claim 4, characterized in that the pigment comprises barium sulphate, bentonite, calcium carbonate, calcium sulphate, ferric(III) oxides, ferric hydroxide, kaolin, carbon black, copper oxide, magnesium oxide, silver, silicon dioxide, in particular Aerosil, Syloid, hydrophobic alkylated silicon dioxide, in particular Aerosil R972, talcum, titanium dioxide, bismuth oxychloride, zinc oxide, zinc stearate or melanin, individually or in a mixture.
6. Composition according to one of claims 1 to 5, characterized in that it contains one or more antioxidative substances, individually or in a mixture, which are dissolved and/or dispersed and/or absorbed in the lipid matrix and/or adsorbed at the surface of the lipid particles.
7. Composition according to claim 6, characterized in that it contains, as antioxidative substance, retinol, retinol derivatives, in particular retinol palmitate, retinol acetate, vitamin E, vitamin E derivatives, in particular vitamin E acetate, vitamin E linoleate, vitamin E nicotinate, vitamin E palmitate, vitamin E-POE (22) succinate, vitamin C, vitamin C derivatives, in particular vitamin C palmitate, magnesium ascorbate, magnesium phosphate, aescine, butylhydroxyanisole (BHA), butylhydroxytoluene (BHT), cysteine, dilaurylthiodipropionate, dodecylgallate, caffeic acid, liponic acid and derivatives, propylgallate,

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flavonoid, in particular rutin or a derivative of the same, quercetin or a derivative of the same, or tanning agents individually or in a mixture.

8. Composition according to one of claims 1 to 7, characterized in that it additionally contains skin-care substances and/or moisturizing substances which are dissolved and/or dispersed in the lipid matrix and/or are adsorbed at the surface of the lipid particles.
9. Composition according to claim 8, characterized in that it contains, as skin-care substance and/or moisturizing substance, amino acid derivatives, in particular arginine pyroglutamate, glutamic acid, lysine pyroglutamate, glucose, glycerol, urea, mucopolysaccharide, in particular hyaluronic acid, sodium lactate, sodium pyrrolidone carboxylic acid, propylene glycol, vitamin A, in particular retinols or a derivative of the same, polysaccharides, uronic acids, saccharose glutamate, allantoin, biotin, bisabolol, cholesterol, collagen or a derivative of the same, elastin, glycoproteins, hyaluronic acid or a derivative of the same, keratin or a derivative of the same, lecithin, linoleic acid, linolenic acid, milk proteins, niacinamide, panthenol or a derivative of the same, riboflavin, sulphur, urea, soybean oil, tocopherol or a derivative of the same, individually or in a mixture.
10. Composition according to one of claims 1 to 9, characterized in that it additionally contains natural, synthetic, semi-synthetic scents, individually or in a mixture, which are dissolved and/or dispersed in the lipid matrix and/or adsorbed at the surface of the lipid particles.
11. Composition according to claim 10, characterized in that the additional natural, synthetic or semi-synthetic scents are ethereal oils, perfumes, pheromones or repellents.

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12. Composition according to claim 11, characterized in that it contains, as ethereal oils, lemon oil, rose oil, lavender oil, bergamot oil, balm mint oil, clove oil, cinnamon oil, orange oil, jasmine oil, rosemary oil, aniseed oil, peppermint oil, sandalwood oil, ylang-ylang oil or their isolated ingredients, in particular 1,8-cineole, menthol, terpinol hydrate, limonene,  $\alpha$ -pinene or eugenol.
13. Composition according to claim 11 or 12, characterized in that it contains as perfumes Allure, Coco, Egoiste, Chanel No. 5, 19, 22 from Chanel, Miss Dior, Dune, Diorissime or Fahrenheit from Dior, Roma, Laura, Venezia from Laura Biagotti, L'air du temps from Nina Ricci, Chalimar from Guerlain, Tresor from Lancome, Gio from Armani, Escape, Obsession, CK One, CK Be, Eternity from Calvin Klein, Berlin, Joop, Rococo, All about Eve, What about Adam, Nightflight from Joop, KL, Lagerfeld, Jako from Karl Lagerfeld or Extreme from Bulgari.
14. Composition according to claim 11, 12 or 13, characterized in that it contains as repellents natural repellents, in particular citrus oils, eucalyptus oil and camphor or synthetic repellents, in particular N,N-diethyl-toluamide (DEET), dibutyl phthalate, dimethyl phthalate or 2-ethyl-1,3-hexandiol.
15. Composition according to one of claims 1 to 14, characterized in that it contains, as lipid, lipids/lipoids solid at room temperature (20°C), such as natural and synthetic mono-, di- und triglycerides, their mixtures, natural and synthetic waxes, fatty alcohols, esters und ethers of the same, individually or in a mixture, in particular carnauba wax, cetyl palmitate, glycerol monostearate, glycerol palmitostearate, glycerol ricinoleate, glycerol tribehenate (Compritol), glycerol trilaurate, hard fat (Witepsols), hydrophilic beeswax, microcrystalline triglycerides (Dynasanes), stearyl alcohol, individually or in a mixture.

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16. Composition according to one of claims 1 to 15, characterized in that it contains at least one lipid solid at room temperature (20°C), to which at least one lipid liquid at room temperature is added to produce a lipid mixture (lipid blend).
17. Composition according to claim 16, characterized in that it contains as added liquid lipid, (saturated, partially saturated and unsaturated), medium chain triglycerides (MCTs), in particular Miglyol, especially Miglyol 812, Miglyol 810, Miglyol 840, long chain triglycerides (LCTs), in particular isopropyl myristate, vegetable oils, in particular avocado oil, cotton-seed oil, safflower oil, peanut oil, jojoba oil, coconut oil, linseed oil, walnut oil, olive oil, palm-kernel oil, sesame oil, wheatgerm oil, animal oils, in particular cod-liver oil, halibut-liver oil, neat's foot oil, individually or in a mixture.
18. Composition according to one of claims 1 to 17, characterized in that the lipid particles were produced by grinding, in particular in a ball mill or a mortar mill or by air-jet milling.
19. Composition according to one of claims 1 to 17, characterized in that the lipid particles were produced by dispersing the lipid in an outer liquid phase, the lipid being in the solid and/or liquid state.
20. Composition according to claim 19, characterized in that the lipid has been dispersed in an outer phase below its melting point, in particular by a rotor-stator colloid mill, a high-speed mixer, in particular a dissolver disk, a high pressure homogenizer, in particular a piston-gap homogenizer or with a Microfluidizer.
21. Composition according to claim 19, characterized in that the lipid has been dispersed in an outer phase close to or above

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its melting point, in particular by a rotor-stator colloid mill, a high-speed mixer, in particular an Ultra-Turrax, Silverson mixer, a dissolver disc, a microscale or macroscale static mixer, a high pressure homogenizer, in particular a piston-gap homogenizer or with a Microfluidizer.

22. Composition according to one of claims 1 to 21, characterized in that the lipid particles dispersed in the outer liquid phase are stabilized by surfactants, polymers or antiflocculants and/or a stabilization against particle aggregation has been effected by increasing the viscosity of the liquid phase by adding viscosity-increasing substances.
23. Composition according to claim 22, characterized in that there are contained, as surfactants, sorbitan fatty acid esters such as Tween, in particular Tween 80, Span, in particular Span 85, sugar esters, in particular saccharose stearate, saccharose distearate, saccharose laurate, saccharose octanoate, saccharose palmitate, saccharose myristate, fatty alcohols, in particular cetylstearyl alcohol, sodium cetylstearyl sulphate, cocoamidopropylbetain (Tego Betain L7FG), sodium cocoamphoacetate (Miranol Ultra 32), polyglycerol methylglucose distearate (Tego Care 450), lecithins, in particular soybean lecithin or egg lecithin, alkaline soaps, metal soaps, in particular calcium dilaurate, natural surfactants, in particular saponins, individually or in a mixture.
24. Composition according to claim 22, characterized in that it contains, as polymers, block polymers, in particular poloxamers, especially Poloxamer 188 or 407, polyvinyl derivatives, in particular polyvinyl acetate, polyvinyl alcohol, polyvinyl pyrrolidone, polystyrenes, individually or in a mixture.
25. Composition according to claim 22, characterized in that it contains, in particular, as antiflocculants, sodium citrate,

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sodium pyrophosphate or sodium sorbate individually or in a mixture.

26. Composition according to claim 22, characterized in that it contains, as increasing-increasing substances, cellulose derivatives, in particular carboxymethyl cellulose, cellulose acetate phthalate, hydroxyethyl cellulose, methyl cellulose, methylhydroxyethyl cellulose, methylhydroxypropyl cellulose, polyacrylates, polyacrylic acids, polyvinyl derivatives, alginates, bentonite, highly-dispersed silicon dioxide (Aerosil), pectins, tragacanth or xanthan, individually or in a mixture.
27. Composition according to one of claims 1 to 26, characterized in that the outer phase of the dispersion also contains additional UV blocking substances and/or UV blocking particles, in particular titanium dioxide, zinc oxide, melanin or silicates, in particular Aerosils.
28. Composition according to one of the claims 1 to 27, characterized in that it is present in the form of a formulation for application on skin and mucous membranes, in particular as a lotion, cream, ointment, paste, stick, in particular lipstick, or skin spray.
29. Composition according to one of the claims 1 to 27, characterized in that it is present in the form of a formulation for application on hair or scalp, in particular as a shampoo, conditioner or aqueous or oily lotion.
30. Use of solid, polymorphic, crystalline or partially crystalline lipid particles or a composition according to one of the preceding claims as an agent with UV radiation-absorbing and/or reflecting action, for application on the skin, mucous membranes, hair and scalp for protection against health-damaging UV radiation and strengthening the natural skin barrier.

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31. Use according to claim 30, characterized in that the particles dispersed in an outer phase, in particular water, are applied direct as a dispersion onto the skin or mucous membranes.
32. Use of solid, polymorphic crystalline or partially crystalline lipid particles or a composition as defined in any of the preceding claims for the preparation of agents having UV radiation-absorbing and/or reflecting action for application on the skin, muscous membrans, hair and scalp for protection against health-damaging UV radiation and strengthening the natural skin barrier.

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